Power Management *for* Computers

and other Office Equipment

A Best Practices Resource Guide

SEC

STATE ELECTRONICS CHALLENGE

C/o The Northeast Recycling Council, Inc. (NERC)
139 Main St., Suite 401, Brattleboro, VT 05301
802-254-3636
www.stateelectronicschallenge.net
info@stateelectronicschallenge.net
NERC is an equal opportunity provider and employer.

Developed with support from Beacon Consultants Network Inc.

Introduction

This resource guide addresses common questions that energy managers, facility managers, and IT administrators have about the power management of computers and other office equipment. The purpose of this document is to help:

1. Non-technical audiences appreciate the considerable energy-saving opportunities presented by computer power management and understand how to overcome implementation challenges;
2. Technical audiences gain a head-start on power management initiatives by providing an overview of important implementation considerations and a guide to additional technical resources.

This guide was developed for the State Electronics Challenge by the Northeast Recycling Council, Inc., with grant funding from the U.S. Environmental Protection Agency Region 2.

1) What is power management?

Broadly speaking, power management refers to a number of tactics and tools for reducing the energy consumed by electronic office equipment. For example, most computer operating systems have power management features that automatically place computers and/or monitors into low-power "sleep modes" after a period of inactivity. Many copiers, printers, scanners, fax machines, and all-in-one devices have similar features. Additionally, one can deploy "smart" power strips to manage the power consumed by idle office electronics, such as desktop printers, computer speakers, and desk lamps. Bottom line: power management saves energy, money, and helps protect the environment.

2) What are computer power management features?

Computer power management (CPM) features — standard in Windows and Macintosh operating systems — automatically place computers (meaning the CPU, the hard drive, and other internal components) and their monitors into low-power "sleep modes" after a period of inactivity. Simply touching the mouse or keyboard "wakes" the computer and monitor in seconds. While *monitors* are commonly configured to sleep, unfortunately fewer than 10% of U.S.-based *computers* are configured to take full advantage of these energy-saving features.

There are many ways to activate sleep features across entire networks of computers, including free solutions that utilize open source software and/or network tools that most organizations already have at their disposal. Alternatively, a number of commercial software packages offer more feature-rich solutions for a fee, and may deliver more energy savings. Either way, organizations are saving up to $100 per computer annually — and sometimes even more — by activating and managing computer power management settings.

3) Monitor power management vs. screen savers vs. computer power management vs. simply turning everything off: what's the difference?

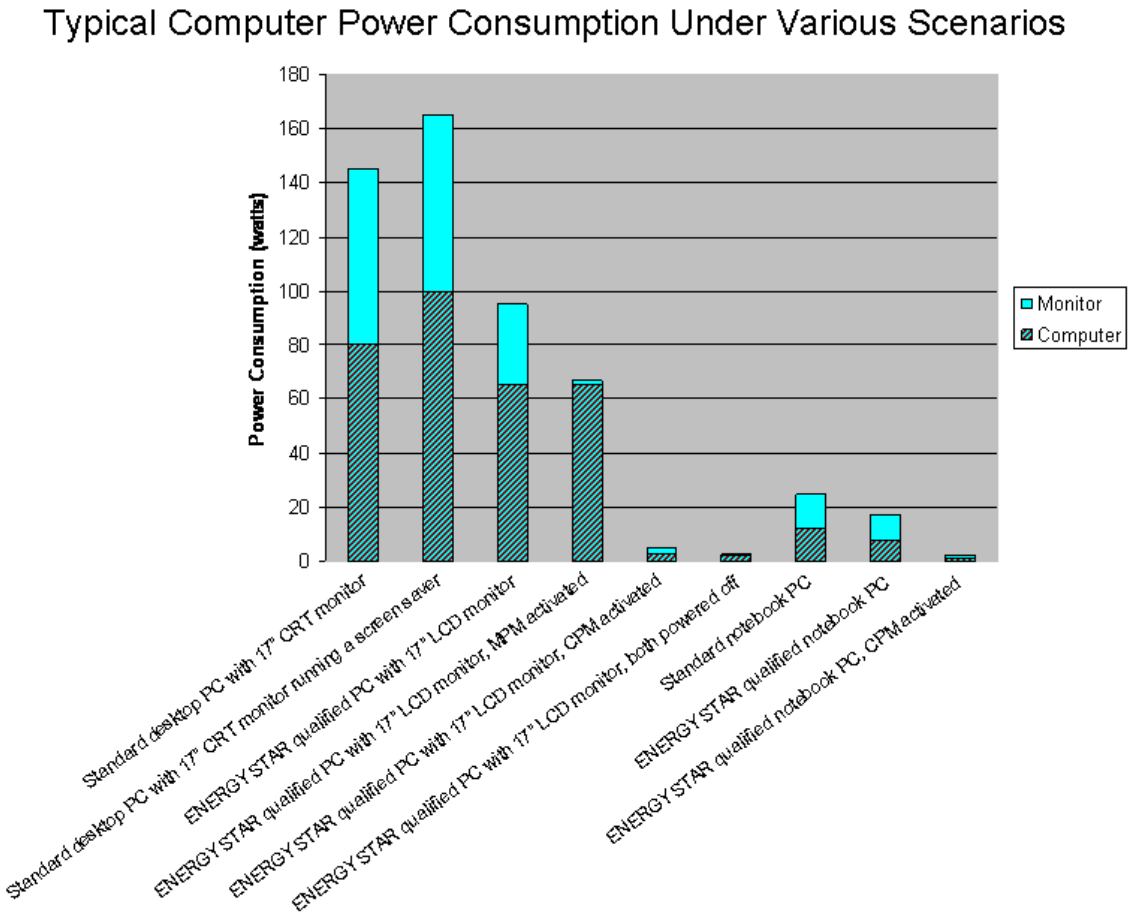
Monitor power management (MPM) places only the computer's *display* into a low power sleep mode after a period of inactivity. This results in the screen going dark, dropping monitor power consumption from 30-115 watts (depending on the model) down to just 1-3 watts of power. Monitor power management should not to be confused with a screen saver, which can actually increase the energy used by both the display and the computer's processor. In fact, certain graphics-intensive screen savers can cause the computer to burn twice as much energy, and may actually prevent a computer from entering sleep mode.

Many organizations already take advantage of MPM because it is easy to activate, doesn't interfere with software patching, and saves $10-50 per monitor annually in electricity. But don't make any assumptions. If you've never seen your screen go "black" after a period of inactivity, then MPM settings have probably not been activated.

Computer power management (specifically, "system standby" and/or "hibernate" on Windows PCs, and "sleep" on Macs) essentially takes MPM one giant step further: in addition to placing the monitor into sleep mode, CPM settings power off the CPU, the hard drive, and other components. This drops computer power consumption down to just a few watts, and saves $10-50 more annually than MPM alone. For computers that don't already utilize MPM, CPM can save $20-100 or more, because CPM puts *both* the computer and its monitor into low power sleep modes.

Activating CPM features can be more challenging than MPM because care must be taken to ensure that sleeping computers do not interfere with the distribution of administrative software updates (also known as software "patches.") However, the energy savings from CPM more than offsets the effort involved in meeting this challenge.

Incidentally, turning computers and monitors OFF doesn't mean they aren't drawing power. In fact, a typical computer and monitor combo still draws 2-5 watts of power from the wall outlet, even when they are completely shut down. As far as power consumption is concerned, utilizing power management features is almost the same as turning computers and monitors completely off. If you think you'd save just a little more energy — and a lot of trouble — by simply requiring people to turn off their computers each night, think again. See Myth #1 in Section 19 below.



4) How can I tell if monitor and/or computer power management features are enabled?

If your monitor screen automatically goes dark and appears to be off after a period of inactivity, monitor power management is enabled. If, in addition to the monitor darkening, the low hum of your hard drive stops after a period of inactivity, either system standby or hibernate is probably enabled. To be sure, you need to check the power options/energy saver settings on your computer. Section 12 below provides instructions on how to do this for most Windows and Macintosh operating systems.

5) Why should I care about computer power management?

While many organizations take advantage of *monitor* power management features, the U.S. EPA and the Lawrence Berkeley National Laboratory estimate that only 5-10% of computers in the U.S. utilize *computer* power management features. Yet the case for activating system power management settings on computers is compelling. The benefits include:

- **Save money.** CPM features cut the electricity used by computers roughly in half; saving $10-50 per computer annually. If you don't already use monitor power management features, your savings can be as high as $100 per computer annually or more. (You can estimate your savings using the ENERGY STAR online savings calculator at www.energystar.gov/lowcarbonit.)
- **Use less air conditioning.** CPM features reduce office cooling loads, which can save an additional $5-10 per computer annually, and as much as $10-25 or more in warm climates. This is because computers and monitors generate a considerable amount of heat when in operation.
- **Decrease the cost of electricity.** Using less electricity during office hours can result in a lower per kilowatt hour rate from your electric utility (by reducing what are known as "peak load demand charges.")
- **Enhance data security.** CPM features reduce the chance that valuable information is displayed on unattended computers.
- **Improve user productivity.** Computers wake up from sleep modes much faster than they can boot up from "off." Eliminating the wait for computers to boot up can save as much as 5 minutes daily.
- **Comply with Executive Order 13423.** All federal facilities are required to activate "sleep" features on their computers.
- **Prevent pollution.** Saving energy prevents pollution associated with generating electricity and lowers your carbon footprint.
- **Earn positive publicity.** CPM initiatives make for good PR, and the media generally takes notice. Taxpayers, customers, and other stakeholders genuinely appreciate CPM projects because they save energy, money, and help protect the environment.

6) How much will activating computer power management features cost my organization?

In small organizations, activating CPM settings takes only a few minutes of time per computer. For instructions, see Section 12 below.

Even in enterprise settings (large organizations), CPM offers a very compelling return on investment (ROI). CPM delivers energy savings of $40-400 or more per computer over 4 years, the typical lifetime of an enterprise PC. By contrast, implementation costs are minimal and may include:

- IT staff time, as care must be taken to ensure that sleeping computers do not interfere with the distribution of administrative software updates. Additionally, older software applications and peripheral devices should be tested for "sleep compatibility." Even for the largest companies, these precautions rarely take more than a few days of work, and are generally in the neighborhood of $1-5 per computer.
- Software solutions. There are lots of ways to activate sleep settings across entire networks of computers, and many are free. Commercial software packages offer additional flexibility and features, but software licensing fees in the range of $3-15 per computer may apply. For software options, see Section 13 below.

7) Who's using computer power management to save energy?

Organizations throughout the Northeast are already using computer power management to cut energy costs and better the environment. They include the State of New Jersey Board of Public Utilities; the County of Erie, New York; the Town of Glastonbury, Connecticut; the City of Providence Rhode Island Public Schools; Arcadia University in Glenside, Pennsylvania; the University of Baltimore (Maryland); North Syracuse Central School District (New York); FedEx; and OfficeMax — to name just a few.

Case Study: West Hartford (Connecticut) Public Schools

Challenge:

- Neither monitor nor computer power management settings were in use.
- Most computers (Windows PCs) were not being turned off after hours.

Solution:

- Activated computer power management settings using ENERGY STAR's free EZ GPO tool.
- Set monitors to sleep after 30 minutes of idle time and computers to sleep after 40 minutes of idle time.

Results:

- More than 3,000 computers sleep when they are inactive.
- Average of $63.86 in energy savings per PC annually.
- Nearly $200,000 savings per year.

8) Why the surge of interest in power management?

Broad interest in sustainable business practices, awareness of the relationship between energy usage and climate change, coupled with rising energy costs and better systems management tools have contributed to the popularity of "green IT" initiatives like computer power management, server virtualization, and data center efficiency measures. For most organizations, the energy savings offered by computer power management eclipses that of server virtualization and data center efficiency measures, for the simple reason that most organizations operate numerous desktop and notebook computers, and relatively few servers and data centers. Plus computer power management initiatives are relatively easy and low-cost to implement — with significant financial and environmental benefits — while the other green IT initiatives can be more complex and expensive.

9) How much can I expect in the way of energy savings?

Activating computer power management features can save $10-50 or more per computer annually. And if monitor power management (MPM) features are not already deployed, computer power management savings can be $20-100 or more. These figures are based on extensive metering of a variety of computers and monitors using watt meters such as the one pictured here.

Actual savings from computer power management can vary widely depending on a number of factors, including how much power the computer draws in the first place, user behavior, and the sleep settings. Free savings estimates are available via a number of online calculators, such as the one offered by ENERGY STAR at www.energystar.gov/lowcarbonit. Additional online savings calculators are listed by the Climate Savers Computing Initiative at www.climatesaverscomputing.org/tools/applications.

10) What specific settings/configurations should I use?

EPA recommends setting computers to enter system standby or hibernate after 30 to 60 minutes of inactivity. To save even more, set monitors to enter sleep mode after 5 to 20 minutes of inactivity. The lower the setting, the more energy you save.

For notebook computers, be sure to activate system standby and/or hibernate features in the AC power profile (which takes effect when the notebook is plugged into the wall) — not just the DC power profile (which only extends battery life).

Factors Affecting Actual Energy Savings

Baseline Computer Power Consumption

Form factor (e.g., desktop vs. notebook), component hardware, and even software applications affect the baseline amount of power that a computer consumes, and hence the amount of energy that computer power management features can save. For instance, a "standard" desktop with a high-end Graphics Processing Unit (GPU) running graphics-intensive applications such as high-definition video will consume far more power than an ENERGY STAR qualified notebook PC used primarily for email and word processing.

User Behavior

Where end-users conscientiously turn off their computers at night, additional energy savings from computer power management is relatively small, because idle workstations only have an opportunity to automatically drop into sleep mode during the workday (e.g., during lunch, meetings, etc.). However, data and anecdotal evidence suggests that the majority of computer users in the United States leave their machines powered on overnight. Even in organizations with clearly communicated policies requiring users to turn off their PCs at night, IT managers typically estimate compliance at only 70-90%.

IT managers commonly call for end-users to leave PCs powered-on after hours so they can access machines remotely for software patching and security updates. Under these conditions, a standard desktop set to automatically enter system standby after 30 minutes and a 17" CRT monitor set to enter sleep after 15 minutes will save over 1,100 kWh per year. However, if that same system is manually powered off every evening by the end user, sleep settings add a much more modest savings of 89 kWh per year.

Computer users may have permission — depending on how their machines are configured — to change default power management settings. In some situations this permission is desirable: users may need to temporarily defeat sleep settings during a live software demonstration, for instance. (Note that most slide show applications such as Microsoft PowerPoint temporarily override sleep settings when in presentation mode, making changes to the default power management settings unnecessary.) Over time, however, these user-initiated changes could result in energy savings degradation, as users disable their computers' power management settings and either forget to reapply them or chose not to do so. To ensure ongoing energy savings, CPM settings can be configured to revert back to defaults upon login, or permission to change settings can simply be denied altogether, or granted only to select groups of end users.

Sleep Settings Utilized

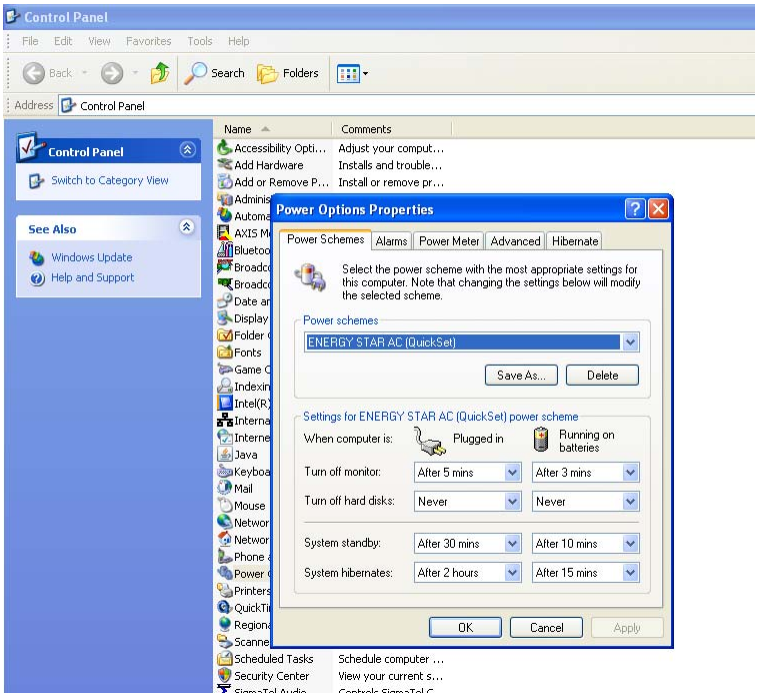
EPA recommends setting computers to enter system standby or hibernate after 30 to 60 minutes of inactivity. To save even more, set monitors to enter sleep mode after 5 to 20 minutes of inactivity. The lower the setting, the more energy you save.

11) In the Windows Power Options menu I see *turn off monitor*, *turn off hard disks*, *system standby*, and *hibernate*. What exactly do these mean?

There are four basic types of computer power management, or "sleep" features on Windows PCs:

1. "Turn off monitor" (also known as monitor power management or MPM) drops monitor power consumption down to 1-3 watts, can wake up in seconds or less, and saves roughly half as much as system standby or hibernate: about $10-40 annually.
2. "Turn off hard disks" stops the hard drive(s) from spinning, thus saving energy. Because computer hard drives are very efficient, turning them off saves very little energy (a watt or less) and is not a serious energy conservation measure.
3. "System standby" drops both computer and monitor power consumption down to 1-3 watts each, can wake up within seconds, and saves $20-100 per PC annually.
4. "System hibernates" drops both computer and monitor power consumption down to 1-3 watts each, saving $20-100 per PC annually. Computers take longer to wake up from hibernation — potentially 20 seconds or more — but because hibernation writes all active applications to the hard drive, open documents and applications are preserved in the event of power loss.

Computer power management (CPM) refers to the use of either “system standby” or “hibernate” — or both — on Windows PCs. Some organizations place PCs into system standby after perhaps 30-60 minutes of inactivity, and into hibernate after perhaps 2 hours of inactivity. Using both features in tandem ensures that computers wake quickly from sleep mode during the day, but drop into hibernate overnight to protect open documents and applications should power be lost.



12) What should small organizations (10 or fewer computers) do to power manage computers?

Activating power management features on individual computers is easy. Anyone who's ever made a simple configuration change to their computer will have no trouble activating power management themselves via the "Control Panel" on Windows computers or via "System Preferences" on Macs. Simply select your computer's operating system below and follow the hyperlink to detailed, illustrated instructions from the ENERGY STAR computer power management website:

Microsoft Windows 2000

Microsoft Windows XP

Microsoft Windows Vista

Mac

For more reluctant PC novices, there are *EZ Wizard* and *Edison* — simple software tools that automatically activate power management features for you on Windows desktops and notebooks. They will also help you decide the best power management settings for your situation. EZ Wizard, which works on Windows 2000 and XP, is available from ENERGY STAR as a free download: www.energystar.gov/index.cfm?c=power_mgt.pr_power_mgt_ez_wiz. Edison, which works on Windows XP and Vista PCs, is available for free from the Microsoft website at www.microsoft.com/environment/edison.aspx. You can share these links with your colleagues to help them activate sleep settings on their own PCs.

For individuals and small organizations without centralized IT departments, computer software is generally pre-configured to automatically download and apply updates shortly after resuming from sleep mode. On the other hand, if your organization has IT staff, you need to check with them to ensure that computers with power management features activated will still receive software updates such as new antivirus definitions and Windows security patches. For more information on activating CPM in larger organizations, see Section 13 below.

Note that PC users who currently leave their computers powered 24/7 for remote access (using software such as GoToMyPC.com) should use monitor power management features only, as it may not be possible to remotely "wake" computers from system standby or hibernate mode.

13) What should larger organizations (any organization with IT staff) do to power manage computers?

There are many ways to activate sleep features across entire networks of computers, including free solutions that utilize open-source software and/or tools that you may already have at your disposal.

Alternatively, a number of commercial software packages offer more feature-rich solutions for a fee and may deliver more energy savings.

There are two primary challenges associated with activating computer power management features in larger organizations:

1. Activating sleep settings on multiple computers at one time. (While it is certainly possible to manually configure sleep settings on each and every computer in your

organization, most IT administrators would prefer to avoid such a labor-intensive approach.)

2. Ensuring that sleeping computers can still receive administrative software updates such as Windows security patches and new antivirus definitions. (Sleeping computers can't download and apply software updates without first being awakened.)

Fortunately, a number of solutions exist for addressing both of these challenges in almost any IT environment, as described below.

"Free" Solutions for Activating Sleep Settings

The following solutions can help you activate sleep settings on computers and monitors; they are either free or included with software you may already own. Each hyperlink will take you to a website where additional details are available. Remember, it is critically important, to ensure that sleeping computers can still receive administrative software updates (such as Windows security patches and antivirus definitions) *prior to activating sleep settings.* See the next Section below for additional details.

- Microsoft Group Policy provides a way to centrally manage Windows Vista power management features.
- Microsoft Group Policy *Preferences* provide a way to centrally activate monitor and computer power management features on Windows Vista and XP machines, but require either 1) Windows Server 2008, or 2) a Windows 2003 environment being managed via either Windows Server 2008 or Windows Vista.
- EZ GPO allows a network administrator to centrally control computer power management settings on Windows 2000 and XP PCs using Group Policy Objects.
- If you replicate hard drives from a template image when you upgrade operating systems and/or roll out new hardware, enabling sleep settings in the template image will ensure that all computers receive these settings.
- Powercfg.exe can be used in a logon script to configure power management settings in Windows XP and Vista. This method requires enhancing registry rights, which can be configured through Group Policy.
- Windows Task Scheduler can be used to put PCs into standby or hibernate mode.
- EZ Wizard is a simple software tool that automatically activates sleep settings on individual PCs running Windows 2000 or XP. Because it can be launched from a website, EZ Wizard is an ideal solution for diverse computing environments like colleges and universities.
- Microsoft promotes a power management tool, Edison, developed by Verdiem. It allows individual users to power manage their Windows XP and Vista PCs, and estimate their savings.
- If you use Microsoft's System Center Configuration Manager (SCCM), Microsoft Assessment Configuration Pack for ENERGY STAR Power Management allows you to centrally review sleep settings on Windows XP and Vista PCs. Prior to implementation, this tool can provide you with a baseline for energy savings estimates. Following implementation, it can provide confirmation that sleep settings have been changed.

"Free" Solutions for Ensuring that Sleeping Computers Continue to Receive Software Updates

Prior to activating computer sleep settings, it is important to make sure that the settings do not interfere with the distribution of administrative software updates (such as Windows

security patches and antivirus definitions). This may be accomplished in one of several ways:

1. Configure client computers to apply software patches and updates as soon as computers become available on the network. When services such as WSUS, Norton Anti Virus (and other client-driven update services) are running in conjunction with a sleeping, network disconnected, or "off" computer, the next time the computer is turned on or connected to the network, these services force a check-in with the update server. The client computer then downloads and installs software updates in order to "catch-up" to the current level of patching. For more information, see the ENERGY STAR computer power management website: www.energystar.gov/index.cfm?c=power_mgt.pr_power_mgt_config.
2. Windows Task Scheduler can automatically wake up sleeping computers for updates. Scripts distributed via Active Directory allow network administrators to centrally manage these "scheduled tasks." For more information, see the ENERGY STAR computer power management website: www.energystar.gov/index.cfm?c=power_mgt.pr_power_mgt_win_task.
3. With Wake-on-LAN activated, a network administrator can wake up sleeping computers at any time in order to perform on-demand software patches or updates. For more information, see the ENERGY STAR computer power management website: www.energystar.gov/index.cfm?c=power_mgt.pr_power_mgt_wol.

Commercial CPM Software Solutions

A number of commercial software packages provide computer power management functionality. Some also offer a way to ensure that administrative software updates (such as Windows security updates and antivirus definitions) are applied to computers that "sleep." Commercial software packages may offer more feature-rich solutions and may deliver more energy savings, but they involve fees that typically range from $3-15 per computer. Each hyperlink below will take you to the vendor's website where additional details are available. Inclusion in this list does not constitute endorsement, approval, or certification of software packages by the Northeast Recycling Council, Inc., the State Electronics Challenge, or the U.S. Environmental Protection Agency.

- Adaptiva Companion™ centrally manages Windows PC power policies and produces energy savings reports. It can power inactive PCs off and wake them for software updates, and allows end-users to establish custom work and holiday schedules.
- Avocent's LANDesk Management Suite allows administrators to centrally control end-node power consumption by facilitating the creation, financial evaluation, and deployment of power management policies.
- BigFix Power Management enables enterprises to set and enforce power conservation measures on Windows PCs and may also integrate PC power conservation with other BigFix security and system management functions.
- eiPower Saver Solution is an enterprise desktop power management application that monitors the power events of PCs. Administrators can view power events, set, enforce, and fine-tune Windows power settings from a central location to save power, and not interfere with PC software administration.
- Faronics Power Save is an enterprise class software product with a single mandate of identifying and shutting down inactive workstations and reporting the energy savings. It runs on both Windows PCs and Macs.
- KBOX™ Systems Management Appliances (by Kace) allows IT managers to create and enforce Windows power management policies across both local and remote

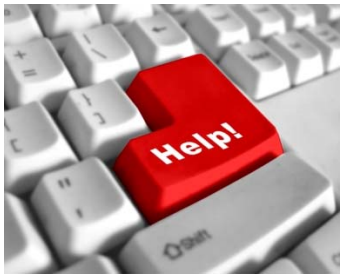
environments, and provides visibility into compliance and savings with customizable reports.

- NightWatchman and 1EWakeUp (from 1E) allow you to shut down Windows PCs and wake them up for software updates at night.
- Remote Desktop (from Apple) can centrally control power management features on Macs.
- Surveyor (from Verdiem) allows you to activate manage, measure and reduce Windows PC network energy consumption. Surveyor provides centralized administration of power management settings for networked PCs with intelligent policies that maximize energy savings by placing machines into lower power states without interfering with end-user productivity, desktop maintenance, or upgrades.
- SysTrack Power Management (from Lakeside Software Inc.) offers simple automated remote deployment to target desktop systems, dynamic power schedule discovery based on actual use, and system wakeup that does not rely on Wake-on-LAN technology.
- Triumfant's Green IT Power Management reduces computer power consumption without impacting computer use or administration. Based on an organization's energy management policies, Triumfant's Green IT Power Management solution automatically detects when a Windows PC is out of compliance and automatically adjusts it to the correct power configuration settings.
- vPro is a platform built into Intel systems that supports remote out-of-band management of Windows PCs, irrespective of the operating system's state. As such, it has the capability to wake up sleeping computers to deploy updates and applications, or to take remote control of client PCs for maintenance. vPro has a management component integrated with Microsoft's System Center Configuration Manager (SCCM), making it easier to power up a vPro client PC that is turned off or in sleep mode in order to execute any number of system maintenance tasks.

Note: computer users requiring 24/7 remote access to their desktops from outside a firewall (via Remote Desktop, for instance) may want to utilize monitor power management features only, as it may not be possible to remotely "wake" computers from system standby or hibernate mode.

14) I'm feeling overwhelmed by the number of options available. Where can I get help in identifying the best solution(s) for my organization?

Activating computer power management settings can be somewhat technically challenging in a large enterprise environment, due to the shear quantity and variety of hardware and software in use. As a result, implementation demands a modest investment of IT staff time. Before they can implement any changes, IT staff must research, evaluate, and test software and configuration changes necessary to deploy computer power management. When computers fail to enter sleep mode properly — and occasionally they do — or when old software fails to behave when machines enter sleep mode, IT staff must ascertain the causes and deploy fixes such as software driver updates, hardware configuration changes, and sometimes even BIOS updates.



Fortunately, ENERGY STAR offers free technical assistance that can save your IT staff considerable time in overcoming these challenges.

ENERGY STAR provides free, one-on-one technical consultation to help you determine the best way in your particular IT environment to: 1) activate CPM settings, 2) ensure that sleeping computers still receive software patches, and 3) troubleshoot problems, should any arise.

To schedule a consultation, you must join the ENERGY STAR Low Carbon IT Campaign at www.energystar.gov/lowcarbonit. Joining is free; ENERGY STAR only requires that you make a non-binding "pledge" to power manage your computers.

15) Is it true that some utilities will help pay for computer power management solutions?

Yes. A number of utilities and utility-funded state energy efficiency programs offer rebates and other incentives to organizations for activating and managing computer power management features. In the Northeast they include Connecticut Light and Power, New York Power Authority, New York State Energy Research & Development Authority (NYSERDA), Northeast Utilities, NSTAR, and others. Call your energy provider and ask if they offer incentive funding for CPM solutions.

16) My IT colleagues have technical concerns about CPM. How can I address them?

You may find that your IT colleagues have technical questions or concerns about computer power management that you can't answer. In addition to common myths presented in Section 19 below, answers to frequently asked questions are available on the ENERGY STAR website at www.energystar.gov/index.cfm?c=power_mgt.pr_power_mgt_faq.

If you still have unanswered questions, you can schedule a conference call between your IT colleagues and ENERGY STAR's support contractors, who can field just about any technical question related to computer power management. To do so, join the ENERGY STAR Low Carbon IT Campaign at www.energystar.gov/lowcarbonit. Joining is free; ENERGY STAR requires only that you make a non-binding "pledge" to power manage your computers.

17) Where should I start?

1. Evaluate your organization's current power management situation by asking your IT manager about default settings, or by conducting a small survey of computers. The instructions contained in Section 12 of this guide will help you check current power management settings on individual computers. Are sleep features enabled on monitors? Computers? How frequently do computers appear to be left on at night? Roughly how many computers and monitors are there in total?
2. Estimate the savings potential by entering the information you gather into one of the online savings calculators available at www.energystar.gov/lowcarbonit or www.climatesaverscomputing.org/tools/applications.
3. Request free technical assistance from ENERGY STAR to get answers to technical questions and to help identify the best solution(s) for your organization.
4. If necessary, build a business case for CPM. CPM offers a very compelling return on investment (ROI) in the vast majority of situations. Section 5 of this guide outlines the costs and benefits associated with a computer power management implementation, and can augment your savings estimates in making the business case for CPM.

18) What can I do about computer peripherals and other office equipment to save energy?

1. **Buy ENERGY STAR qualified office equipment.**

   Office equipment that has earned the ENERGY STAR helps save energy through special energy-efficient designs, which allow them to use less energy to perform regular tasks and to automatically enter a low-power mode when not in use. Most office equipment is left on for 24 hours a day, making energy-efficient design and power management features important for saving energy.

   The following office products are eligible for the ENERGY STAR. For a complete listing of product categories and qualified products, see www.energystar.gov/products.

- Computers
- Copier and fax machines
- Digital duplicators
- Enterprise servers
- Various electronic devices that are powered by efficient external power adapters (also known as external power supplies), including:
- Ethernet switches, routers, modems, bridges, and gateways; wifi access points, IP phones, IP cameras, and mobile phone chargers
- Notebook computers and tablet PCs
- Mailing machines
- Monitors/displays
- Printer, scanners, and all-in-one devices
- Water coolers

Energy savings calculators for many of these products are available on the ENERGY STAR website: www.energystar.gov/index.cfm?c=bulk_purchasing.bus_purchasing#off.

2. **Configure office machines to utilize energy-saving sleep modes.**

   Computers and monitors aren't the only office machines with power management features that need to be activated. Printers, copiers, and fax machines can be configured to enter low-power sleep or standby modes as well. Printers that "sleep" when not active can use 60% less electricity compared to standard models, and copiers and fax machines can use 40% less. Consult your product's owner's manual or the manufacturer's website for instructions.

3. **Use compact fluorescent light bulbs (CFLs) in office lamps and task lights.**

   A CFL will save about $30 over its lifetime and pay for itself in about six months. It uses 75% less energy and lasts about ten times longer than an incandescent bulb.

4. **Consider using "smart" power strips for lighting, computer accessories, and other miscellaneous plug loads in cubicles and offices.**

   Many electronic products continue to draw power from the wall even w[illegible]ey are powered off. It's not always practical to unplug these items whe[illegible]e your desk, but "smart" power strips can effectively do so for you[illegible]ly

   three types of "smart" power strips:

   1. Current sensing. Current sensing po[illegible]automatically turn several outlets off or on when they detect that [illegible]puter (plugged into the "master outlet") either enters a low powered sle[illegible]p mode, is turned off, or is turned on. Used in combination with computer power management features, these power strips can turn computer peripherals such as powered speakers, printers, and external hard drives off and on automatically.
   2. Occupancy sensing. Occupancy sensing power strips have outlets that are controlled by a motion detector. Devices plugged into them can automatically

turn off or on in response to your physical presence, or after a user-defined time delay elapses (anywhere from 30 seconds to 30 minutes).

3. Timer-equipped. These power strips have outlets that are controlled by programmable timers. Devices plugged into them can be scheduled to automatically turn off or on at designated times of day or night.

Smart power strips are available from most electronics retailers.

5. **Ask your bottled water vendor for an ENERGY STAR qualified water cooler, and turn off the hot water tap if possible.**

   A standard hot & cold bottled water cooler can use more energy than a large refrigerator. An ENERGY STAR qualified model requires about half as much energy as a standard unit, and turning off the hot water tap if it's not needed can even more dramatically reduce energy consumption. For information, see www.energystar.gov/watercooler.

6. **Ask your vending machine operator for ENERGY STAR refrigerated beverage vending machines.**

   ENERGY STAR qualified new and rebuilt refrigerated beverage vending machines can save 1,700 kWh/year, or $150 annually on utility bills. For more information see www.energystar.gov/vending. If ENERGY STAR qualified vending machines are not available, use a product like VendingMiser or a timer-equipped power strip to cut energy waste. You can even remove the light bulbs in vending machines to save energy.

7. **Put coffee makers on timers.**

   Coffee makers are often energy hogs, consuming roughly 3% of the plug load in office buildings according to one NYSERDA study. Put them on timer-equipped outlets and program them to automatically turn off in the afternoon or evening.

19) What's the truth behind some of the more common myths about computer power management?

Myth 1: You'd actually save more energy — and a lot of trouble — if you simply required people to turn off their computers each night.

- ✓ **Truth:** While you might save an additional watt or two by turning off a computer instead of placing it in system standby or hibernate mode, forgetting to shut down your computer just a handful of times will negate an entire year's worth of incremental energy savings. Surveys and interviews with IT managers consistently conclude that policies "requiring" users to turn off their PCs at night result in only about 70-90% compliance. Bottom line: you will save more energy by using CPM settings, because they automatically put computers into low-power sleep modes.

  In some larger organizations where CPM features are in use, turning computers off instead of putting them into sleep mode may actually interfere with software patching. (Certain software patching solutions can wake computers from sleep modes to perform updates, but not from *off*.) If this is the case in your organization, your IT administrator should provide you with instructions for how to leave your computer during nights and weekends.

Myth 2: Sleep features can wear out hardware by forcing the computer to turn on and off several times a day.

- ✓ **Truth:** Modern computers are designed to handle 40,000 on-off cycles before failure, and you're unlikely to approach that number even if you keep your computer 5-7 years. Some studies indicate it would require on-off cycling every five minutes for years to harm a hard drive.

Myth 3: Computer power management saves a substantial amount of energy on desktops, but not on notebook computers.

- ✓ **Truth:** While they use less energy than desktops, notebook computers still burn about 16-30 watts of power. System standby and hibernate features reduce notebook power draw to 1-2 watts — a considerable savings. Be sure to activate CPM features in the AC power profile (which takes effect when the notebook is plugged into the wall) — not just the DC power profile (which only extends battery life.)

Myth 4: Computers and monitors use more energy with power management settings activated, due to power surges when cycling on and off.

- ✓ **Truth:** The small surge of power created when computers and monitors are turned on is far smaller than the energy used by running the device when it is not needed.

Myth 5: System standby and hibernate features can render a Windows PC unstable, causing system crashes and/or preventing it from waking.

- ✓ **Truth:** While problematic in early versions of Windows, these features work almost flawlessly in Windows 2000, XP, and Vista.

Myth 6: Computer users will complain about having to wait for their machines to "wake" from system standby or hibernate.

- ✓ **Truth:** Employees typically embrace power management when they understand that they are saving money and preventing pollution. Plus "waking" computers takes far less time than booting. Inform your employees about power management settings prior to activating them, and share information about the economic and environmental benefits.

Myth 7: Sleeping computers will not receive important software updates such as new antivirus definitions and Windows security patches.

- ✓ **Truth:** There are numerous ways to ensure that software updates are applied, including waking up computers through the network prior to distributing updates. See Section 13 above.

Myth 8: Because Microsoft ships Vista software with computer power management settings enabled, there is no need to worry about sleep settings on Vista machines.

- ✓ **Truth:** While Microsoft does ship Vista with sleep settings enabled, operating systems are usually installed by PC makers, enterprise IT departments, computer resellers, or 3rd party service providers. Windows default power management settings are not typically retained.

Myth 9: My network administrator says our Windows PCs are "enabled for hibernate," so we must already be taking advantage of computer power management features.

- ✓ **Truth:** For the hibernate feature to be available, it is sometimes necessary to enable it in Windows. This does not mean that PCs are configured to automatically enter hibernate after 30 to 60 minutes of inactivity. To avoid potential confusion, ask if PCs are "configured to automatically enter system standby or hibernate after 30 to 60 minutes of inactivity."

Myth 10: The *Turn off Hard Disks* power management feature available in Windows saves lots of energy.

- ✓ **Truth:** Modern hard drives are so efficient that the *Turn off Hard Disks* feature actually saves very little power. Only *system standby* and *hibernate* features offer substantial energy savings. Make sure your IT manager isn't confusing *Turn off Hard Disks* with true CPM.

20) Some of our PCs won't enter sleep mode. What's the problem?

You may find that some Windows PCs don't go to sleep after the designated idle time. There can be a number of reasons for this. Graphics-intensive screen savers can prevent PCs from entering sleep mode and should be disabled. Additionally, PCs may not enter sleep mode when they have a file open over the network. Certain software applications may be preventing the computer from sleeping. (Software applications can tell the Windows operating system not to put the PC into sleep mode.) Also, make sure you have the latest video driver from your monitor manufacturer, as the default Windows driver may not support system standby or hibernate mode.

For technical assistance troubleshooting computers with "insomnia," join the ENERGY STAR Low Carbon IT Campaign at www.energystar.gov/lowcarbonit and contact ENERGY STAR for assistance.

21) Where can I find additional information on CPM and office energy savings?

1. ENERGY STAR's computer power management website: www.energystar.gov/powermanagement. In addition to common myths presented in this guide, answers to frequently asked questions are available at www.energystar.gov/index.cfm?c=power_mgt.pr_power_mgt_faq.
2. Climate Savers Computing Initiative website for enterprises: www.climatesaverscomputing.org/learn/information-and-resources/
3. NYSERDA Energy $mart^{SM} Offices Project website: www.nyserda.org/programs/offices/default.asp